

49321-89.ST25.txt
SEQUENCE LISTING

<110> Oregon Health & Science University
Frueh, Klaus
Nerenberg, Bianca
Bartee, Eric
Mansouri, Mandana
Gouveia, Kristine

<120> DOWNREGULATION OF CELL SURFACE GLYCOPROTEINS BY A FAMILY OF HUMAN
UBIQUITIN LIGASES

<130> 49321-89

<150> US 60/397,136

<151> 2002-07-19

<160> 66

<170> PatentIn version 3.2

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Arg Ser Gln Ser Arg Leu Ser Val Cys Pro Ser Thr Gln Asp Ile Cys
 65 70 75 80

Arg Ile Cys His Cys Glu Gly Asp Glu Glu Ser Pro Leu Ile Thr Pro
 85 90 95

Cys Arg Cys Thr Gly Thr Leu Arg Phe Val His Gln Ser Cys Leu His
 100 105 110

Gln Trp Ile Lys Ser Ser Asp Thr Arg Cys Cys Glu Leu Cys Lys Tyr
 115 120 125

Asp Phe Ile Met Glu Thr Lys Leu Lys Pro Leu Arg Lys Trp Glu Lys
 130 135 140

Leu Gln Met Thr Thr Ser Glu Arg Arg Lys Ile Phe Cys Ser Val Thr
 145 150 155 160

Phe His Val Ile Ala Ile Thr Cys Val Val Trp Ser Leu Tyr Val Leu
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185

190

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 210 215 220

Leu Trp Arg Arg Leu Lys Ala Tyr Asn Arg Val Ile Phe Val Gln Asn
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Cys Pro Asp Thr Ala Lys Lys Leu Glu Lys Asn Phe Ser Cys Asn Val
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Phe Leu Phe Ile Thr Pro Leu Ala Ala Ile Ser Gly Trp Leu Cys Leu
145 150 155 160

Arg Gly Ala Gln Asp His Leu Arg Leu His Ser Gln Leu Glu Ala Val
165 170 175

Gly Leu Ile Ala Leu Thr Ile Ala Leu Phe Thr Ile Tyr Val Leu Trp
180 185 190

Thr Leu Val Ser Phe Arg Tyr His Cys Gln Leu Tyr Ser Glu Trp Arg
195 200 205

Lys Thr Asn Gln Lys Val Arg Leu Lys Ile Arg Glu Ala Asp Ser Pro
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Thr Leu Leu Leu Ser Phe Leu Gly Met Ala Trp Ala Leu Gln Ala Ala
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30 35 40 45

ctc acc att ctc cga ggc tgt ccg ggg ctg cct ggg gcc cct ggg ccc 193
Leu Thr Ile Leu Arg Gly Cys Pro Gly Leu Pro Gly Ala Pro Gly Pro
50 55 60

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Gly Pro Pro Gly Lys Ala Gly Pro Pro Gly Pro Asn Gly Ala Pro Gly
      80              85              90

gag ccc cag ccg tgc ctg aca ggt gac tga ccacccccac actcctccca    339
Glu Pro Gln Pro Cys Leu Thr Gly Asp
      95              100

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49321-89.ST25.txt

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49321-89.ST25.txt

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Gly Pro Ser Val Tyr Arg Ile Phe Lys Arg Trp Gln Ala Val Asn Gln

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49321-89.ST25.txt

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agaacactac tacagttctg aaggggaaat ataacatcta tggttatata ttttaaaaac 2789
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<213> Homo sapiens

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Cys Phe Ala Thr Asp Glu Asp Asp Arg Thr Ala Glu Trp Val Arg Pro
          20          25          30

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Cys Arg Cys Arg Gly Ser Thr Lys Trp Val His Gln Ala Cys Leu Gln
35          40          45

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Arg Trp Val Asp Glu Lys Gln Arg Gly Asn Ser Thr Ala Arg Val Ala
 50 55 60

Cys Pro Gln Cys Asn Ala Glu Tyr Leu Ile Val Phe Pro Lys Leu Gly
 65 70 75 80

Pro Val Val Tyr Val Leu Asp Leu Ala Asp Arg Leu Ile Ser Lys Ala
 85 90 95

Cys Pro Phe Ala Ala Ala Gly Ile Met Val Gly Ser Ile Tyr Trp Thr
 100 105 110

Ala Val Thr Tyr Gly Ala Val Thr Val Met Gln Val Val Gly His Lys
 115 120 125

Glu Gly Leu Asp Val Met Glu Arg Ala Asp Pro Leu Phe Leu Leu Ile
 130 135 140

Gly Leu Pro Thr Ile Pro Val Met Leu Ile Leu Gly Lys Met Ile Arg
 145 150 155 160

Trp Glu Asp Tyr Val Leu Arg Leu Trp Arg Lys Tyr Ser Asn Lys Leu
 165 170 175

Gln Ile Leu Asn Ser Ile Phe Pro Gly Ile Gly Cys Pro Val Pro Arg
 180 185 190

Ile Pro Ala Glu Ala Asn Pro Leu Ala Asp His Val Ser Ala Thr Arg
 195 200 205

Ile Leu Cys Gly Ala Leu Val Phe Pro Thr Ile Ala Thr Ile Val Gly
 210 215 220

Lys Leu Met Phe Ser Ser Val Asn Ser Asn Leu Gln Arg Thr Ile Leu
 225 230 235 240

Gly Gly Ile Ala Phe Val Ala Ile Lys Gly Ala Phe Lys Val Tyr Phe
 245 250 255

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275

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 1 5 10 15
 ctt cct ctc gct tcc tct ctc gca cct gag cgt acg cac ctg ccc ggg 96
 Leu Pro Leu Ala Ser Ser Leu Ala Pro Glu Arg Thr His Leu Pro Gly
 20 25 30
 ccc ggc tcc ctc ctc ctc tcc cct ccc tct ttc ccc gcc cgg ccg cgg 144
 Pro Gly Ser Leu Leu Leu Ser Pro Pro Ser Phe Pro Ala Arg Pro Arg
 35 40 45
 gag cct cgt ggc tgc gtc acc gcc gcc ccc cca gac aag atg gac acc 192
 Glu Pro Arg Gly Cys Val Thr Ala Ala Pro Pro Asp Lys Met Asp Thr
 50 55 60
 gcg gag gaa gac ata tgt aga gtg tgt cgg tca gaa gga aca cct gag 240
 Ala Glu Glu Asp Ile Cys Arg Val Cys Arg Ser Glu Gly Thr Pro Glu
 65 70 75 80
 aaa ccg ctt tat cat cct tgt gta tgt act ggc agt att aag ttt atc 288
 Lys Pro Leu Tyr His Pro Cys Val Cys Thr Gly Ser Ile Lys Phe Ile
 85 90 95
 cat caa gaa tgc tta gtt caa tgg ctg aaa cac agt cga aaa gaa tac 336
 His Gln Glu Cys Leu Val Gln Trp Leu Lys His Ser Arg Lys Glu Tyr
 100 105 110
 tgt gaa tta tgc aag cac aga ttt gct ttt aca cca att tat tct cca 384
 Cys Glu Leu Cys Lys His Arg Phe Ala Phe Thr Pro Ile Tyr Ser Pro
 115 120 125
 gat atg cct tca cgg ctt cca att caa gac ata ttt gct gga ctg gtt 432
 Asp Met Pro Ser Arg Leu Pro Ile Gln Asp Ile Phe Ala Gly Leu Val
 130 135 140
 aca agt att ggc act gca ata cga tat tgg ttt cat tat aca ctt gtg 480
 Thr Ser Ile Gly Thr Ala Ile Arg Tyr Trp Phe His Tyr Thr Leu Val
 145 150 155 160
 gcc ttt gca tgg ttg gga gtt gtt cct ctt aca gca tgc cgc atc tac 528
 Ala Phe Ala Trp Leu Gly Val Val Pro Leu Thr Ala Cys Arg Ile Tyr
 165 170 175
 aag tgc ttg ttt act ggc tcc gtg agc tca cta ctg acg ctg cca tta 576

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Lys	Cys	Leu	Phe	Thr	Gly	Ser	Val	Ser	Ser	Leu	Leu	Thr	Leu	Pro	Leu	
			180					185					190			
gat	atg	ctg	tca	acg	gaa	aat	ttg	ttg	gca	gat	tgt	ttg	cag	ggg	tgt	624
Asp	Met	Leu	Ser	Thr	Glu	Asn	Leu	Leu	Ala	Asp	Cys	Leu	Gln	Gly	Cys	
		195					200					205				
ttt	gtg	gtg	acg	tgc	aca	ctg	tgt	gca	ttc	atc	agc	ctg	gtg	tgg	ttg	672
Phe	Val	Val	Thr	Cys	Thr	Leu	Cys	Ala	Phe	Ile	Ser	Leu	Val	Trp	Leu	
	210					215					220					
aga	gag	cag	ata	gtc	cat	ggg	gga	gca	cca	att	tgg	ttg	gag	cat	gct	720
Arg	Glu	Gln	Ile	Val	His	Gly	Gly	Ala	Pro	Ile	Trp	Leu	Glu	His	Ala	
225					230					235					240	
gcc	cca	ccg	ttc	aat	gct	gcg	ggg	cat	cac	caa	aat	gag	gct	cca	gca	768
Ala	Pro	Pro	Phe	Asn	Ala	Ala	Gly	His	His	Gln	Asn	Glu	Ala	Pro	Ala	
				245					250					255		
gga	gga	aat	ggg	gca	gaa	aat	gtt	gct	gct	gat	cag	cct	gct	aac	cca	816
Gly	Gly	Asn	Gly	Ala	Glu	Asn	Val	Ala	Ala	Asp	Gln	Pro	Ala	Asn	Pro	
			260					265					270			
cca	gct	gag	aac	gca	gtg	gtg	ggg	gaa	aac	cct	gat	gcc	cag	gat	gac	864
Pro	Ala	Glu	Asn	Ala	Val	Val	Gly	Glu	Asn	Pro	Asp	Ala	Gln	Asp	Asp	
		275					280					285				
cag	gca	gaa	gag	gag	gag	gag	gac	aat	gag	gag	gaa	gat	gac	gct	ggg	912
Gln	Ala	Glu	Glu	Glu	Glu	Glu	Asp	Asn	Glu	Glu	Glu	Asp	Asp	Ala	Gly	
	290					295					300					
gtg	gag	gat	gcg	gca	gat	gct	aat	aac	gga	gcc	cag	gat	gac	atg	aat	960
Val	Glu	Asp	Ala	Ala	Asp	Ala	Asn	Asn	Gly	Ala	Gln	Asp	Asp	Met	Asn	
305					310					315					320	
tgg	aat	gct	tta	gaa	tgg	gac	cga	gct	gct	gaa	gag	ctt	aca	tgg	gaa	1008
Trp	Asn	Ala	Leu	Glu	Trp	Asp	Arg	Ala	Ala	Glu	Glu	Leu	Thr	Trp	Glu	
			325					330					335			
aga	atg	cta	gga	ctt	gat	gga	tca	cta	gtt	ttt	ctg	gaa	cat	gtc	ttc	1056
Arg	Met	Leu	Gly	Leu	Asp	Gly	Ser	Leu	Val	Phe	Leu	Glu	His	Val	Phe	
			340					345					350			
tgg	gtg	gta	tct	tta	aat	aca	ctg	ttc	att	ctt	gtt	ttt	gca	ttt	tgc	1104
Trp	Val	Val	Ser	Leu	Asn	Thr	Leu	Phe	Ile	Leu	Val	Phe	Ala	Phe	Cys	
		355					360					365				
cct	tac	cat	att	ggg	cat	ttc	tcc	ctt	gtt	ggg	ttg	gga	ttt	gaa	gaa	1152
Pro	Tyr	His	Ile	Gly	His	Phe	Ser	Leu	Val	Gly	Leu	Gly	Phe	Glu	Glu	
	370					375					380					
cac	gtc	caa	gca	tct	cat	ttt	gaa	ggc	cta	atc	aca	acc	ata	gtt	ggg	1200
His	Val	Gln	Ala	Ser	His	Phe	Glu	Gly	Leu	Ile	Thr	Thr	Ile	Val	Gly	
385					390					395					400	
tat	ata	ctt	tta	gca	ata	aca	ctg	ata	att	tgt	cat	ggc	ttg	gca	act	1248
Tyr	Ile	Leu	Leu	Ala	Ile	Thr	Leu	Ile	Ile	Cys	His	Gly	Leu	Ala	Thr	
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ctt gtg aaa ttt cat aga tct cgt cgc tta ctg gga gtc tgc tat att	1296
Leu Val Lys Phe His Arg Ser Arg Arg Leu Leu Gly Val Cys Tyr Ile	
420 425 430	
gtt gtt aag gtc tct ttg tta gtg gtg gta gaa att gga gta ttc cct	1344
Val Val Lys Val Ser Leu Leu Val Val Val Glu Ile Gly Val Phe Pro	
435 440 445	
ctc att tgt ggt tgg tgg ctg gat atc tgt tcc ttg gaa atg ttt gat	1392
Leu Ile Cys Gly Trp Trp Leu Asp Ile Cys Ser Leu Glu Met Phe Asp	
450 455 460	
gct act ctg aaa gat cga gaa ctg agc ttt cag tcg gct cca ggt act	1440
Ala Thr Leu Lys Asp Arg Glu Leu Ser Phe Gln Ser Ala Pro Gly Thr	
465 470 475 480	
acc atg ttt ctg cat tgg cta gtg gga atg gta tat gtc ttc tac ttt	1488
Thr Met Phe Leu His Trp Leu Val Gly Met Val Tyr Val Phe Tyr Phe	
485 490 495	
gcc tcc ttc att cta cta ctg aga gag gta ctt cga cct ggt gtc ctg	1536
Ala Ser Phe Ile Leu Leu Leu Arg Glu Val Leu Arg Pro Gly Val Leu	
500 505 510	
tgg ttt cta agg aat ttg aat gat cca gat ttc aat cca gta cag gaa	1584
Trp Phe Leu Arg Asn Leu Asn Asp Pro Asp Phe Asn Pro Val Gln Glu	
515 520 525	
atg atc cat ttg cca ata tat agg cat ctc cga aga ttt att ttg tca	1632
Met Ile His Leu Pro Ile Tyr Arg His Leu Arg Arg Phe Ile Leu Ser	
530 535 540	
gtg att gtc ttt ggc tcc att gtc ctc ctg atg ctt tgg ctt cct ata	1680
Val Ile Val Phe Gly Ser Ile Val Leu Leu Met Leu Trp Leu Pro Ile	
545 550 555 560	
cgt ata att aag agt gtg ctg cct aat ttt ctt cca tac aat gtc atg	1728
Arg Ile Ile Lys Ser Val Leu Pro Asn Phe Leu Pro Tyr Asn Val Met	
565 570 575	
ctc tac agt gat gct cca gtg agt gaa ctg tcc ctc gag ctg ctt ctg	1776
Leu Tyr Ser Asp Ala Pro Val Ser Glu Leu Ser Leu Glu Leu Leu Leu	
580 585 590	
ctt cag gtt gtc ttg cca gca tta ctc gaa cag gga cac acg agg cag	1824
Leu Gln Val Val Leu Pro Ala Leu Leu Glu Gln Gly His Thr Arg Gln	
595 600 605	
tgg ctg aag ggg ctg gtg cga gcg tgg act gtg acc gcc gga tac ttg	1872
Trp Leu Lys Gly Leu Val Arg Ala Trp Thr Val Thr Ala Gly Tyr Leu	
610 615 620	
ctg gat ctt cat tct tat tta ttg gga gac cag gaa gaa aat gaa aac	1920
Leu Asp Leu His Ser Tyr Leu Leu Gly Asp Gln Glu Glu Asn Glu Asn	
625 630 635 640	
agt gca aat caa caa gtt aac aat aat cag cat gct cga aat aac aac	1968
Ser Ala Asn Gln Gln Val Asn Asn Asn Gln His Ala Arg Asn Asn Asn	
645 650 655	

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gct att cct gtg gtg gga gaa ggc ctt cat gca gcc cac caa gcc ata Ala Ile Pro Val Val Gly Glu Gly Leu His Ala Ala His Gln Ala Ile 660 665 670	2016
ctc cag cag gga ggg cct gtt ggc ttt cag cct tac cgc cga cct tta Leu Gln Gln Gly Gly Pro Val Gly Phe Gln Pro Tyr Arg Arg Pro Leu 675 680 685	2064
aat ttt cca ctc agg ata ttt ctg ttg att gtc ttc atg tgt ata aca Asn Phe Pro Leu Arg Ile Phe Leu Leu Ile Val Phe Met Cys Ile Thr 690 695 700	2112
tta ctg att gcc agc ctc atc tgc ctt act tta cca gta ttt gct ggc Leu Leu Ile Ala Ser Leu Ile Cys Leu Thr Leu Pro Val Phe Ala Gly 705 710 715 720	2160
cgt tgg tta atg tcg ttt tgg acg ggg act gcc aaa atc cat gag ctc Arg Trp Leu Met Ser Phe Trp Thr Gly Thr Ala Lys Ile His Glu Leu 725 730 735	2208
tac aca gct gct tgt ggt ctc tat gtt tgc tgg cta acc ata agg gct Tyr Thr Ala Ala Cys Gly Leu Tyr Val Cys Trp Leu Thr Ile Arg Ala 740 745 750	2256
gtg acg gtg atg gtg gca tgg atg cct cag gga cgc aga gtg atc ttc Val Thr Val Met Val Ala Trp Met Pro Gln Gly Arg Arg Val Ile Phe 755 760 765	2304
cag aag gtt aaa gag tgg tct ctc atg atc atg aag act ttg ata gtt Gln Lys Val Lys Glu Trp Ser Leu Met Ile Met Lys Thr Leu Ile Val 770 775 780	2352
gcg gtg ctg ttg gct gga gtt gtc cct ctc ctt ctg ggg ctc ctg ttt Ala Val Leu Leu Ala Gly Val Val Pro Leu Leu Leu Gly Leu Leu Phe 785 790 795 800	2400
gag ctg gtc att gtg gct ccc ctg agg gtt ccc ttg gat cag act cct Glu Leu Val Ile Val Ala Pro Leu Arg Val Pro Leu Asp Gln Thr Pro 805 810 815	2448
ctt ttt tat cca tgg cag gac tgg gca ctt gga gtc ctg cat gcc aaa Leu Phe Tyr Pro Trp Gln Asp Trp Ala Leu Gly Val Leu His Ala Lys 820 825 830	2496
atc att gca gct ata aca ttg atg ggt cct cag tgg tgg ttg aaa act Ile Ile Ala Ala Ile Thr Leu Met Gly Pro Gln Trp Trp Leu Lys Thr 835 840 845	2544
gta att gaa cag gtt tac gca aat ggc atc cgg aac att gac ctt cac Val Ile Glu Gln Val Tyr Ala Asn Gly Ile Arg Asn Ile Asp Leu His 850 855 860	2592
tat att gtt cgt aaa ctg gca gct ccc gtg atc tct gtg ctg ttg ctt Tyr Ile Val Arg Lys Leu Ala Ala Pro Val Ile Ser Val Leu Leu Leu 865 870 875 880	2640
tcc ctg tgt gta cct tat gtc ata gct tct ggt gtt gtt cct tta cta Ser Leu Cys Val Pro Tyr Val Ile Ala Ser Gly Val Val Pro Leu Leu 885 890 895	2688

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885	890	895	
ggt gtt act gcg gaa atg caa aac tta gtc cat cgg cgg att tat cca			2736
Gly Val Thr Ala Glu Met Gln Asn Leu Val His Arg Arg Ile Tyr Pro			
900	905	910	
ttt tta ctg atg gtc gtg gta ttg atg gca att ttg tcc ttc caa gtc			2784
Phe Leu Leu Met Val Val Val Leu Met Ala Ile Leu Ser Phe Gln Val			
915	920	925	
cgc cag ttt aag cgc ctt tat gaa cat att aaa aat gac aag tac ctt			2832
Arg Gln Phe Lys Arg Leu Tyr Glu His Ile Lys Asn Asp Lys Tyr Leu			
930	935	940	
gtg ggt caa cga ctc gtg aac tac gaa cgg aaa tct ggc aaa caa ggc			2880
Val Gly Gln Arg Leu Val Asn Tyr Glu Arg Lys Ser Gly Lys Gln Gly			
945	950	955	960
tca tct cca cca cct cca cag tca tcc caa gaa taa agtagttgtc			2926
Ser Ser Pro Pro Pro Pro Gln Ser Ser Gln Glu			
965	970		
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gaaattattt ttaattttga taatttaata ttcctagtgt gatcagcatt gggagttggg			3646
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caaagcttca ggtagaagt ttagaaaaat agaatggttg ggtacatgat ctaaagtgtt 4246
aatgctaaag gtatatcgta agggtagtgt ttgtttttga acgataattt agaagttctc 4306
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20 25 30

Pro Gly Ser Leu Leu Leu Ser Pro Pro Ser Phe Pro Ala Arg Pro Arg
35 40 45

Glu Pro Arg Gly Cys Val Thr Ala Ala Pro Pro Asp Lys Met Asp Thr
50 55 60

Ala Glu Glu Asp Ile Cys Arg Val Cys Arg Ser Glu Gly Thr Pro Glu
65 70 75 80

Lys Pro Leu Tyr His Pro Cys Val Cys Thr Gly Ser Ile Lys Phe Ile
85 90 95

His Gln Glu Cys Leu Val Gln Trp Leu Lys His Ser Arg Lys Glu Tyr
100 105 110

Cys Glu Leu Cys Lys His Arg Phe Ala Phe Thr Pro Ile Tyr Ser Pro
115 120 125

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Asp Met Pro Ser Arg Leu Pro Ile Gln Asp Ile Phe Ala Gly Leu Val
130 135 140

Thr Ser Ile Gly Thr Ala Ile Arg Tyr Trp Phe His Tyr Thr Leu Val
145 150 155 160

Ala Phe Ala Trp Leu Gly Val Val Pro Leu Thr Ala Cys Arg Ile Tyr
165 170 175

Lys Cys Leu Phe Thr Gly Ser Val Ser Ser Leu Leu Thr Leu Pro Leu
180 185 190

Asp Met Leu Ser Thr Glu Asn Leu Leu Ala Asp Cys Leu Gln Gly Cys
195 200 205

Phe Val Val Thr Cys Thr Leu Cys Ala Phe Ile Ser Leu Val Trp Leu
210 215 220

Arg Glu Gln Ile Val His Gly Gly Ala Pro Ile Trp Leu Glu His Ala
225 230 235 240

Ala Pro Pro Phe Asn Ala Ala Gly His His Gln Asn Glu Ala Pro Ala
245 250 255

Gly Gly Asn Gly Ala Glu Asn Val Ala Ala Asp Gln Pro Ala Asn Pro
260 265 270

Pro Ala Glu Asn Ala Val Val Gly Glu Asn Pro Asp Ala Gln Asp Asp
275 280 285

Gln Ala Glu Glu Glu Glu Glu Asp Asn Glu Glu Glu Asp Asp Ala Gly
290 295 300

Val Glu Asp Ala Ala Asp Ala Asn Asn Gly Ala Gln Asp Asp Met Asn
305 310 315 320

Trp Asn Ala Leu Glu Trp Asp Arg Ala Ala Glu Glu Leu Thr Trp Glu
325 330 335

Arg Met Leu Gly Leu Asp Gly Ser Leu Val Phe Leu Glu His Val Phe
340 345 350

Trp Val Val Ser Leu Asn Thr Leu Phe Ile Leu Val Phe Ala Phe Cys

355

360

365

Pro Tyr His Ile Gly His Phe Ser Leu Val Gly Leu Gly Phe Glu Glu
 370 375 380

His Val Gln Ala Ser His Phe Glu Gly Leu Ile Thr Thr Ile Val Gly
 385 390 395 400

Tyr Ile Leu Leu Ala Ile Thr Leu Ile Ile Cys His Gly Leu Ala Thr
 405 410 415

Leu Val Lys Phe His Arg Ser Arg Arg Leu Leu Gly Val Cys Tyr Ile
 420 425 430

Val Val Lys Val Ser Leu Leu Val Val Val Glu Ile Gly Val Phe Pro
 435 440 445

Leu Ile Cys Gly Trp Trp Leu Asp Ile Cys Ser Leu Glu Met Phe Asp
 450 455 460

Ala Thr Leu Lys Asp Arg Glu Leu Ser Phe Gln Ser Ala Pro Gly Thr
 465 470 475 480

Thr Met Phe Leu His Trp Leu Val Gly Met Val Tyr Val Phe Tyr Phe
 485 490 495

Ala Ser Phe Ile Leu Leu Leu Arg Glu Val Leu Arg Pro Gly Val Leu
 500 505 510

Trp Phe Leu Arg Asn Leu Asn Asp Pro Asp Phe Asn Pro Val Gln Glu
 515 520 525

Met Ile His Leu Pro Ile Tyr Arg His Leu Arg Arg Phe Ile Leu Ser
 530 535 540

Val Ile Val Phe Gly Ser Ile Val Leu Leu Met Leu Trp Leu Pro Ile
 545 550 555 560

Arg Ile Ile Lys Ser Val Leu Pro Asn Phe Leu Pro Tyr Asn Val Met
 565 570 575

Leu Tyr Ser Asp Ala Pro Val Ser Glu Leu Ser Leu Glu Leu Leu Leu
 580 585 590

49321-89.ST25.txt

Leu Gln Val Val Leu Pro Ala Leu Leu Glu Gln Gly His Thr Arg Gln
 595 600 605

Trp Leu Lys Gly Leu Val Arg Ala Trp Thr Val Thr Ala Gly Tyr Leu
 610 615 620

Leu Asp Leu His Ser Tyr Leu Leu Gly Asp Gln Glu Glu Asn Glu Asn
 625 630 635 640

Ser Ala Asn Gln Gln Val Asn Asn Asn Gln His Ala Arg Asn Asn Asn
 645 650 655

Ala Ile Pro Val Val Gly Glu Gly Leu His Ala Ala His Gln Ala Ile
 660 665 670

Leu Gln Gln Gly Gly Pro Val Gly Phe Gln Pro Tyr Arg Arg Pro Leu
 675 680 685

Asn Phe Pro Leu Arg Ile Phe Leu Leu Ile Val Phe Met Cys Ile Thr
 690 695 700

Leu Leu Ile Ala Ser Leu Ile Cys Leu Thr Leu Pro Val Phe Ala Gly
 705 710 715 720

Arg Trp Leu Met Ser Phe Trp Thr Gly Thr Ala Lys Ile His Glu Leu
 725 730 735

Tyr Thr Ala Ala Cys Gly Leu Tyr Val Cys Trp Leu Thr Ile Arg Ala
 740 745 750

Val Thr Val Met Val Ala Trp Met Pro Gln Gly Arg Arg Val Ile Phe
 755 760 765

Gln Lys Val Lys Glu Trp Ser Leu Met Ile Met Lys Thr Leu Ile Val
 770 775 780

Ala Val Leu Leu Ala Gly Val Val Pro Leu Leu Leu Gly Leu Leu Phe
 785 790 795 800

Glu Leu Val Ile Val Ala Pro Leu Arg Val Pro Leu Asp Gln Thr Pro
 805 810 815

Leu Phe Tyr Pro Trp Gln Asp Trp Ala Leu Gly Val Leu His Ala Lys
 820 825 830

49321-89.ST25.txt

Ile Ile Ala Ala Ile Thr Leu Met Gly Pro Gln Trp Trp Leu Lys Thr
835 840 845

Val Ile Glu Gln Val Tyr Ala Asn Gly Ile Arg Asn Ile Asp Leu His
850 855 860

Tyr Ile Val Arg Lys Leu Ala Ala Pro Val Ile Ser Val Leu Leu Leu
865 870 875 880

Ser Leu Cys Val Pro Tyr Val Ile Ala Ser Gly Val Val Pro Leu Leu
885 890 895

Gly Val Thr Ala Glu Met Gln Asn Leu Val His Arg Arg Ile Tyr Pro
900 905 910

Phe Leu Leu Met Val Val Val Leu Met Ala Ile Leu Ser Phe Gln Val
915 920 925

Arg Gln Phe Lys Arg Leu Tyr Glu His Ile Lys Asn Asp Lys Tyr Leu
930 935 940

Val Gly Gln Arg Leu Val Asn Tyr Glu Arg Lys Ser Gly Lys Gln Gly
945 950 955 960

Ser Ser Pro Pro Pro Pro Gln Ser Ser Gln Glu
965 970

<210> 50
<211> 1925
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(678)

<400> 50
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Pro Gly Ser Leu Phe Arg Phe Ala Val Pro Pro Ala Leu Gly Ser Asn
1 5 10 15

ttg acc gac aat gtc atg atc aca gta gat att att cct tca ggt tgg 96
Leu Thr Asp Asn Val Met Ile Thr Val Asp Ile Ile Pro Ser Gly Trp
20 25 30

aat tca gct gat ggt aaa agt gat aaa act aaa agt gcg cct tca aga 144
Asn Ser Ala Asp Gly Lys Ser Asp Lys Thr Lys Ser Ala Pro Ser Arg
35 40 45

49321-89.ST25.txt

gat cca gaa aga ttg cag aaa ata aaa gag agc ctc ctt tta gag gac Asp Pro Glu Arg Leu Gln Lys Ile Lys Glu Ser Leu Leu Leu Glu Asp 50 55 60	192
tca gaa gaa gaa gaa ggt gac tta tgt aga att tgt caa atg gca gct Ser Glu Glu Glu Glu Gly Asp Leu Cys Arg Ile Cys Gln Met Ala Ala 65 70 75 80	240
gca tca tca tct aat ttg ctg ata gag cca tgc aag tgc aca gga agt Ala Ser Ser Ser Asn Leu Leu Ile Glu Pro Cys Lys Cys Thr Gly Ser 85 90 95	288
ttg cag tat gtc cac caa gac tgt atg aaa aag tgg tta cag gcc aaa Leu Gln Tyr Val His Gln Asp Cys Met Lys Lys Trp Leu Gln Ala Lys 100 105 110	336
att aac tct ggt tct tca tta gaa gct gta acc acc tgt gaa cta tgt Ile Asn Ser Gly Ser Ser Leu Glu Ala Val Thr Thr Cys Glu Leu Cys 115 120 125	384
aaa gag aag ttg gag ctt aac ctg gag gat ttt gat att cat gaa cta Lys Glu Lys Leu Glu Leu Asn Leu Glu Asp Phe Asp Ile His Glu Leu 130 135 140	432
cat aga gct cat gca aat gaa caa gct gag tat gag ttt atc agc tct His Arg Ala His Ala Asn Glu Gln Ala Glu Tyr Glu Phe Ile Ser Ser 145 150 155 160	480
ggt ctc tac cta gtg gtg tta ttg cac ttg tgc gaa caa agc ttt tct Gly Leu Tyr Leu Val Val Leu Leu His Leu Cys Glu Gln Ser Phe Ser 165 170 175	528
gat atg atg gga aat aca aat gaa cca agc aca cgt gtc cga ttt att Asp Met Met Gly Asn Thr Asn Glu Pro Ser Thr Arg Val Arg Phe Ile 180 185 190	576
aac ctt gca aga act ctt cag gca cat atg gaa gat ctc gaa act tca Asn Leu Ala Arg Thr Leu Gln Ala His Met Glu Asp Leu Glu Thr Ser 195 200 205	624
gag gat gat tcc gaa gaa gac gga gac cat aac agg aca ttt gat att Glu Asp Asp Ser Glu Glu Asp Gly Asp His Asn Arg Thr Phe Asp Ile 210 215 220	672
gcc taa cttcatataa gacagatgga tgatctgtga acataagtgt ttattaaaaa Ala 225	728
tggaatttaa atataaatta cttttgtggg ggaatgccta ataaatacat tgactatata	788
taaaatgaat atatacatac acatgtatgc ctgtatatat atattcattc tccagtgttg	848
ctgaattaaa attctgctgg actttttaac atagcaaadc cgatgtttat aaactggtaa	908
tcaaaaagggt tttttctttt aggtgagtg gaaagtatta cccttgtttt aaatatctaa	968
gcaatgccta tcaacccttt tttgtgttat gattactgta gtcataattta tgaaaaaagg	1028

49321-89.ST25.txt

tttgtgtttt actcttgcta gtgagaaaag tgggacaaaa tatacttttg aaataaaatg 1088
ctatatggca cctaattatt ttttctttta aaatgcctta agttgcagtc tcattttgat 1148
aatcatttgc ttccagtgtt taaaaattaa aaaaagaatg gggagaaggt tatgagaaga 1208
gcattattaa gtttccaaat ttaatttgaa ttccaaattc acctagcaat aaaatctaata 1268
ttttaaaaaag tatataaata taaaatgtat aaatgatgga tagatttttg tattgatttg 1328
caaaatgcag attatatattg ataggctata gtatgtagat attcctttta ggaatattac 1388
agctgtaaat tatatgagac ttgccagtca aatgctattt gggtttaaaaa aattattgca 1448
atctcaagtt aatggaatat ttttaaatcc cacattcaga gtttaaaaca ctgggttttca 1508
atgtgttttt tagtgttgtc acttgtttat agataaatat ataaataacc tgtttggatc 1568
ctggtccttt ttaactgttc cttggtaatt ctgagcattt atttgatgac ttaatatattt 1628
tcactacctt tggagaacag atgaacatta ttcaccatga atggatctat actgtgtgggt 1688
catgagttgt gtatacttcc ataacactgt atttttcttc tgtcagtacc cttaggatac 1748
actttaaaac accttaaggt ctgatgttat ggcaacaaac tactttttca aacctaaata 1808
ggaaccatgt aattttctcaa aagtgattga acagtttgcc cacacttagt ttgttggtct 1868
tatgtaaaac attggctcaa aataaagtac acactgattt aaaaaaaaaa aaaaaaa 1925

<210> 51
<211> 225
<212> PRT
<213> Homo sapiens

<400> 51

Pro Gly Ser Leu Phe Arg Phe Ala Val Pro Pro Ala Leu Gly Ser Asn
1 5 10 15

Leu Thr Asp Asn Val Met Ile Thr Val Asp Ile Ile Pro Ser Gly Trp
20 25 30

Asn Ser Ala Asp Gly Lys Ser Asp Lys Thr Lys Ser Ala Pro Ser Arg
35 40 45

Asp Pro Glu Arg Leu Gln Lys Ile Lys Glu Ser Leu Leu Leu Glu Asp
50 55 60

Ser Glu Glu Glu Glu Gly Asp Leu Cys Arg Ile Cys Gln Met Ala Ala
65 70 75 80

Ala Ser Ser Ser Asn Leu Leu Ile Glu Pro Cys Lys Cys Thr Gly Ser

Leu Gln Tyr Val His Gln Asp Cys Met Lys Lys Trp Leu Gln Ala Lys
 100 105 110

Ile Asn Ser Gly Ser Ser Leu Glu Ala Val Thr Thr Cys Glu Leu Cys
 115 120 125

Lys Glu Lys Leu Glu Leu Asn Leu Glu Asp Phe Asp Ile His Glu Leu
 130 135 140

His Arg Ala His Ala Asn Glu Gln Ala Glu Tyr Glu Phe Ile Ser Ser
 145 150 155 160

Gly Leu Tyr Leu Val Val Leu Leu His Leu Cys Glu Gln Ser Phe Ser
 165 170 175

Asp Met Met Gly Asn Thr Asn Glu Pro Ser Thr Arg Val Arg Phe Ile
 180 185 190

Asn Leu Ala Arg Thr Leu Gln Ala His Met Glu Asp Leu Glu Thr Ser
 195 200 205

Glu Asp Asp Ser Glu Glu Asp Gly Asp His Asn Arg Thr Phe Asp Ile
 210 215 220

Ala
 225

<210> 52
 <211> 1863
 <212> DNA
 <213> Homo sapiens

<220>
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 <222> (245)..(1120)

<400> 52
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 ccatggagtt tgtcatctgt aatagaggac gttagtgcatt tagtgatgaa aaaactgctt 120
 accactgact attgtgatct cccagggagt ataaggcagc tccgcacttg aaatccatgg 180
 cccaaaatga ctctaccagt ggagactctc ttctgtgaag aagacgacca gataagaggt 240
 tggg atg agc atg cca ctg cat cag atc tct gcc att cca tcc cag gat 289

49321-89.ST25.txt

Met	Ser	Met	Pro	Leu	His	Gln	Ile	Ser	Ala	Ile	Pro	Ser	Gln	Asp		
1				5				10						15		
gcc	atc	tct	gct	aga	gtc	tac	aga	agt	aag	acc	aaa	gaa	aag	gag	agg	337
Ala	Ile	Ser	Ala	Arg	Val	Tyr	Arg	Ser	Lys	Thr	Lys	Glu	Lys	Glu	Arg	
				20				25						30		
gaa	gaa	cag	aat	gag	aag	act	ttg	gga	cat	ttc	atg	agt	cat	tca	agc	385
Glu	Glu	Gln	Asn	Glu	Lys	Thr	Leu	Gly	His	Phe	Met	Ser	His	Ser	Ser	
			35					40					45			
aac	att	tct	aag	gct	ggg	agt	cct	ccg	tca	gca	tca	gct	ccg	gct	ccg	433
Asn	Ile	Ser	Lys	Ala	Gly	Ser	Pro	Pro	Ser	Ala	Ser	Ala	Pro	Ala	Pro	
			50				55						60			
gtg	tcc	tcc	ttc	tct	cgc	act	tct	atc	acg	cca	tcc	agc	cag	gac	atc	481
Val	Ser	Ser	Phe	Ser	Arg	Thr	Ser	Ile	Thr	Pro	Ser	Ser	Gln	Asp	Ile	
	65					70					75					
tgc	agg	atc	tgc	cac	tgt	gaa	gga	gat	gat	gag	agc	ccc	ctg	atc	acc	529
Cys	Arg	Ile	Cys	His	Cys	Glu	Gly	Asp	Asp	Glu	Ser	Pro	Leu	Ile	Thr	
80					85					90					95	
ccc	tgc	cac	tgc	aca	gga	agc	ctc	cac	ttc	gtg	cac	cag	gcc	tgc	ctg	577
Pro	Cys	His	Cys	Thr	Gly	Ser	Leu	His	Phe	Val	His	Gln	Ala	Cys	Leu	
				100					105					110		
cag	cag	tgg	atc	aag	agc	tcc	gac	acg	cgc	tgc	tgc	gag	ctc	tgc	aag	625
Gln	Gln	Trp	Ile	Lys	Ser	Ser	Asp	Thr	Arg	Cys	Cys	Glu	Leu	Cys	Lys	
			115					120					125			
tat	gag	ttc	atc	atg	gag	acc	aag	ctg	aag	cca	ctg	aga	aaa	tgg	gag	673
Tyr	Glu	Phe	Ile	Met	Glu	Thr	Lys	Leu	Lys	Pro	Leu	Arg	Lys	Trp	Glu	
			130				135						140			
aag	ttg	cag	atg	acg	tcc	agc	gag	cgc	agg	aag	atc	atg	tgc	tca	gtg	721
Lys	Leu	Gln	Met	Thr	Ser	Ser	Glu	Arg	Arg	Lys	Ile	Met	Cys	Ser	Val	
	145					150					155					
aca	ttc	cac	gtc	att	gcc	atc	aca	tgt	gtg	gtc	tgg	tcc	ttg	tat	gtg	769
Thr	Phe	His	Val	Ile	Ala	Ile	Thr	Cys	Val	Val	Trp	Ser	Leu	Tyr	Val	
160					165					170					175	
ctc	att	gac	cgt	act	gct	gag	gag	atc	aag	cag	ggg	cag	gca	aca	gga	817
Leu	Ile	Asp	Arg	Thr	Ala	Glu	Glu	Ile	Lys	Gln	Gly	Gln	Ala	Thr	Gly	
				180					185					190		
atc	cta	gaa	tgg	ccc	ttt	tgg	act	aaa	ttg	gtg	gtt	gtg	gcc	atc	ggc	865
Ile	Leu	Glu	Trp	Pro	Phe	Trp	Thr	Lys	Leu	Val	Val	Val	Ala	Ile	Gly	
			195					200					205			
ttc	acc	gga	gga	ctt	ctt	ttt	atg	tat	gtt	cag	tgt	aaa	gtg	tat	gtg	913
Phe	Thr	Gly	Gly	Leu	Leu	Phe	Met	Tyr	Val	Gln	Cys	Lys	Val	Tyr	Val	
			210				215					220				
caa	ttg	tgg	aag	aga	ctc	aag	gcc	tat	aat	aga	gtg	atc	tat	gtt	caa	961
Gln	Leu	Trp	Lys	Arg	Leu	Lys	Ala	Tyr	Asn	Arg	Val	Ile	Tyr	Val	Gln	
	225					230					235					

49321-89.ST25.txt

aac tgt cca gaa aca agc aaa aag aat att ttt gaa aaa tct cca cta 1009
 Asn Cys Pro Glu Thr Ser Lys Lys Asn Ile Phe Glu Lys Ser Pro Leu
 240 245 250 255

aca gag ccc aac ttt gaa aat aaa cat gga cat gga atc tgt cat tcc 1057
 Thr Glu Pro Asn Phe Glu Asn Lys His Gly His Gly Ile Cys His Ser
 260 265 270

gac aca aac tct tct tgt tgc aca gag cct gaa gac act gga gca gaa 1105
 Asp Thr Asn Ser Ser Cys Cys Thr Glu Pro Glu Asp Thr Gly Ala Glu
 275 280 285

atc att cac gtc tga ttgtgtgcgg gttgtcattt tcctggacat ccatgaagag 1160
 Ile Ile His Val
 290

ctgaaggaaa ttgtttactg ccaattgtat acctttctta tgtcctttaa tagcatagac 1220

tggacaggtg actatttata gtggctttctc tttttctaaa ccctccttag tctcctagaa 1280

aaccttcctg tgggccaggc atgcctgggt cctgcctctg cctggcagct ctgtgggaaa 1340

gtggaagacc ccatgatgac atcatgggga gccagcagag ttcttgccca tgggtcttgag 1400

ctgaatgaga gaataaaatg ccaatcccaa gggaagagga ggagcagggg tgcccaggcc 1460

ctgataccca gccgcctcca gcttgcaagt gtccccagcc tggagcagag cattggggag 1520

tgtctagcca tgacgagaag attccctctg catcacggcg aaccccagga gatggtattg 1580

aaacagaccc ccaaacacag actcctgcct gccctctgcc gatgctgcct cctccatgct 1640

cttgagcagg tggagccatg gtgctctgtg gtggcgcatg attcactgag caaacagcac 1700

tttacagaag aaaatcttta ttttgtaata tgtgtgtcca gcgggattga cactcaaaaa 1760

aagtctcact tagaaatctt cccttcctta cctttgtatc tcctttacat catgagagat 1820

caaaaatcca ttttgcctta catatgcaaa aaaaaaaaaa aaa 1863

<210> 53
 <211> 291
 <212> PRT
 <213> Homo sapiens

<400> 53

Met Ser Met Pro Leu His Gln Ile Ser Ala Ile Pro Ser Gln Asp Ala
 1 5 10 15

Ile Ser Ala Arg Val Tyr Arg Ser Lys Thr Lys Glu Lys Glu Arg Glu
 20 25 30

Glu Gln Asn Glu Lys Thr Leu Gly His Phe Met Ser His Ser Ser Asn
 35 40 45

49321-89.ST25.txt

Ile Ser Lys Ala Gly Ser Pro Pro Ser Ala Ser Ala Pro Ala Pro Val
 50 55 60

Ser Ser Phe Ser Arg Thr Ser Ile Thr Pro Ser Ser Gln Asp Ile Cys
 65 70 75 80

Arg Ile Cys His Cys Glu Gly Asp Asp Glu Ser Pro Leu Ile Thr Pro
 85 90 95

Cys His Cys Thr Gly Ser Leu His Phe Val His Gln Ala Cys Leu Gln
 100 105 110

Gln Trp Ile Lys Ser Ser Asp Thr Arg Cys Cys Glu Leu Cys Lys Tyr
 115 120 125

Glu Phe Ile Met Glu Thr Lys Leu Lys Pro Leu Arg Lys Trp Glu Lys
 130 135 140

Leu Gln Met Thr Ser Ser Glu Arg Arg Lys Ile Met Cys Ser Val Thr
 145 150 155 160

Phe His Val Ile Ala Ile Thr Cys Val Val Trp Ser Leu Tyr Val Leu
 165 170 175

Ile Asp Arg Thr Ala Glu Glu Ile Lys Gln Gly Gln Ala Thr Gly Ile
 180 185 190

Leu Glu Trp Pro Phe Trp Thr Lys Leu Val Val Val Ala Ile Gly Phe
 195 200 205

Thr Gly Gly Leu Leu Phe Met Tyr Val Gln Cys Lys Val Tyr Val Gln
 210 215 220

Leu Trp Lys Arg Leu Lys Ala Tyr Asn Arg Val Ile Tyr Val Gln Asn
 225 230 235 240

Cys Pro Glu Thr Ser Lys Lys Asn Ile Phe Glu Lys Ser Pro Leu Thr
 245 250 255

Glu Pro Asn Phe Glu Asn Lys His Gly His Gly Ile Cys His Ser Asp
 260 265 270

Thr Asn Ser Ser Cys Cys Thr Glu Pro Glu Asp Thr Gly Ala Glu Ile
 275 280 285

Ile His Val
290

<210> 54
<211> 272
<212> PRT
<213> Homo sapiens

<400> 54

Met Thr Ser Ser His Val Cys Cys Asn Phe Leu Asn Met Trp Lys Lys
1 5 10 15

Ser Lys Ile Ser Thr Met Tyr Tyr Leu Asn Gln Asp Ala Lys Leu Ser
20 25 30

Asn Leu Phe Leu Gln Ala Ser Ser Pro Thr Thr Gly Thr Ala Pro Arg
35 40 45

Ser Gln Ser Arg Leu Ser Val Cys Pro Ser Thr Gln Asp Ile Cys Arg
50 55 60

Ile Cys His Cys Glu Gly Asp Glu Glu Ser Pro Leu Ile Thr Pro Cys
65 70 75 80

Arg Cys Thr Gly Thr Leu Arg Phe Val His Gln Ser Cys Leu His Gln
85 90 95

Trp Ile Lys Ser Ser Asp Thr Arg Cys Cys Glu Leu Cys Lys Tyr Asp
100 105 110

Phe Ile Met Glu Thr Lys Leu Lys Pro Leu Arg Lys Trp Glu Lys Leu
115 120 125

Gln Met Thr Thr Ser Glu Arg Arg Lys Ile Phe Cys Ser Val Thr Phe
130 135 140

His Val Ile Ala Ile Thr Cys Val Val Trp Ser Leu Tyr Val Leu Ile
145 150 155 160

Asp Arg Thr Ala Glu Glu Ile Lys Gln Gly Asn Asp Asn Gly Val Leu
165 170 175

Glu Trp Pro Phe Trp Thr Lys Leu Val Val Val Ala Ile Gly Phe Thr
180 185 190

49321-89.ST25.txt

Gly Gly Leu Val Phe Met Tyr Val Gln Cys Lys Val Tyr Val Gln Leu
195 200 205

Trp Arg Arg Leu Lys Ala Tyr Asn Arg Val Ile Phe Val Gln Asn Cys
210 215 220

Pro Asp Thr Ala Lys Lys Leu Glu Lys Asn Phe Ser Cys Asn Val Asn
225 230 235 240

Thr Asp Ile Lys Asp Ala Val Val Val Pro Val Pro Gln Thr Gly Ala
245 250 255

Asn Ser Leu Pro Ser Ala Glu Gly Gly Pro Pro Glu Val Val Ser Val
260 265 270

<210> 55
<211> 25
<212> PRT
<213> Homo sapiens

<400> 55

Met Glu Glu Pro Gln Ser Asp Pro Ser Val Glu Pro Pro Leu Ser Gln
1 5 10 15

Glu Thr Phe Ser Asp Leu Trp Lys Leu
20 25

<210> 56
<211> 253
<212> PRT
<213> Homo sapiens

<400> 56

Met Thr Thr Ser Arg Cys Ser His Leu Pro Glu Val Leu Pro Asp Cys
1 5 10 15

Thr Ser Ser Ala Ala Pro Val Val Lys Thr Val Glu Asp Cys Gly Ser
20 25 30

Leu Val Asn Gly Gln Pro Gln Tyr Val Met Gln Val Ser Ala Lys Asp
35 40 45

Gly Gln Leu Leu Ser Thr Val Val Arg Thr Leu Ala Thr Gln Ser Pro
50 55 60

49321-89.ST25.txt

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Phe Asn Asp Arg Pro Met Cys Arg Ile Cys His Glu Gly Ser Ser Gln
65              70              75              80

Glu Asp Leu Leu Ser Pro Cys Glu Cys Thr Gly Thr Leu Gly Thr Ile
            85              90              95

His Arg Ser Cys Leu Glu His Trp Leu Ser Ser Ser Asn Thr Ser Tyr
            100              105              110

Cys Glu Leu Cys His Phe Arg Phe Ala Val Glu Arg Lys Pro Arg Pro
            115              120              125

Leu Val Glu Trp Leu Arg Asn Pro Gly Pro Gln His Glu Lys Arg Thr
            130              135              140

Leu Phe Gly Asp Met Val Cys Phe Leu Phe Ile Thr Pro Leu Ala Thr
145              150              155              160

Ile Ser Gly Trp Leu Cys Leu Arg Gly Ala Val Asp His Leu His Phe
            165              170              175

Ser Ser Arg Leu Glu Ala Val Gly Leu Ile Ala Leu Thr Val Ala Leu
            180              185              190

Phe Thr Ile Tyr Leu Phe Trp Thr Leu Val Ser Phe Arg Tyr His Cys
            195              200              205

Arg Leu Tyr Asn Glu Trp Arg Arg Thr Asn Gln Arg Val Ile Leu Leu
            210              215              220

Ile Pro Lys Ser Val Asn Val Pro Ser Asn Gln Pro Ser Leu Leu Gly
225              230              235              240

Leu His Ser Val Lys Arg Asn Ser Lys Glu Thr Val Val
            245              250

<210> 57
<211> 410
<212> PRT
<213> Homo sapiens

<400> 57

Met Leu Met Pro Leu Cys Gly Leu Leu Trp Trp Trp Trp Cys Cys Cys
1              5              10              15

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49321-89.ST25.txt

Ser Gly Trp Tyr Cys Tyr Gly Leu Cys Ala Pro Ala Pro Gln Met Leu
20 25 30

Arg His Gln Gly Leu Leu Lys Cys Arg Cys Arg Met Leu Phe Asn Asp
35 40 45

Leu Lys Val Phe Leu Leu Arg Arg Pro Pro Gln Ala Pro Leu Pro Met
50 55 60

His Gly Asp Pro Gln Pro Pro Gly Leu Ala Ala Asn Asn Thr Leu Pro
65 70 75 80

Ala Leu Gly Ala Gly Gly Trp Ala Gly Trp Arg Gly Pro Arg Glu Val
85 90 95

Val Gly Arg Glu Pro Pro Pro Val Pro Pro Pro Pro Pro Leu Pro Pro
100 105 110

Ser Ser Val Glu Asp Asp Trp Gly Gly Pro Ala Thr Glu Pro Pro Ala
115 120 125

Ser Leu Leu Ser Ser Ala Ser Ser Asp Asp Phe Cys Lys Glu Lys Thr
130 135 140

Glu Asp Arg Tyr Ser Leu Gly Ser Ser Leu Asp Ser Gly Met Arg Thr
145 150 155 160

Pro Leu Cys Arg Ile Cys Phe Gln Gly Pro Glu Gln Gly Glu Leu Leu
165 170 175

Ser Pro Cys Arg Cys Asp Gly Ser Val Lys Cys Thr His Gln Pro Cys
180 185 190

Leu Ile Lys Trp Ile Ser Glu Arg Gly Cys Trp Ser Cys Glu Leu Cys
195 200 205

Tyr Tyr Lys Tyr His Val Ile Ala Ile Ser Thr Lys Asn Pro Leu Gln
210 215 220

Trp Gln Ala Ile Ser Leu Thr Val Ile Glu Lys Val Gln Val Ala Ala
225 230 235 240

Ala Ile Leu Gly Ser Leu Phe Leu Ile Ala Ser Ile Ser Trp Leu Ile
245 250 255

Trp Ser Thr Phe Ser Pro Ser Ala Arg Trp Gln Arg Gln Asp Leu Leu
 260 265 270

Phe Gln Ile Cys Tyr Gly Met Tyr Gly Phe Met Asp Val Val Cys Ile
 275 280 285

Gly Leu Ile Ile His Glu Gly Pro Ser Val Tyr Arg Ile Phe Lys Arg
 290 295 300

Trp Gln Ala Val Asn Gln Gln Trp Lys Val Leu Asn Tyr Asp Lys Thr
 305 310 315 320

Lys Asp Leu Glu Asp Gln Lys Ala Gly Gly Arg Thr Asn Pro Arg Thr
 325 330 335

Ser Ser Ser Thr Gln Ala Asn Ile Pro Ser Ser Glu Glu Glu Thr Ala
 340 345 350

Gly Thr Pro Ala Pro Glu Gln Gly Pro Ala Gln Ala Ala Gly His Pro
 355 360 365

Ser Gly Pro Leu Ser His His His Cys Ala Tyr Thr Ile Leu His Ile
 370 375 380

Leu Ser His Leu Arg Pro His Glu Gln Arg Ser Pro Pro Gly Ser Ser
 385 390 395 400

Arg Glu Leu Val Met Arg Val Thr Thr Val
 405 410

<210> 58
 <211> 278
 <212> PRT
 <213> Homo sapiens

<400> 58

Met Pro Asp Gln Ala Leu Gln Gln Met Leu Asp Arg Ser Cys Trp Val
 1 5 10 15

Cys Phe Ala Thr Asp Glu Asp Asp Arg Thr Ala Glu Trp Val Arg Pro
 20 25 30

Cys Arg Cys Arg Gly Ser Thr Lys Trp Val His Gln Ala Cys Leu Gln
 35 40 45

Arg Trp Val Asp Glu Lys Gln Arg Gly Asn Ser Thr Ala Arg Val Ala
 50 55 60
 Cys Pro Gln Cys Asn Ala Glu Tyr Leu Ile Val Phe Pro Lys Leu Gly
 65 70 75 80
 Pro Val Val Tyr Val Leu Asp Leu Ala Asp Arg Leu Ile Ser Lys Ala
 85 90 95
 Cys Pro Phe Ala Ala Ala Gly Ile Met Val Gly Ser Ile Tyr Trp Thr
 100 105 110
 Ala Val Thr Tyr Gly Ala Val Thr Val Met Gln Val Val Gly His Lys
 115 120 125
 Glu Gly Leu Asp Val Met Glu Arg Ala Asp Pro Leu Phe Leu Leu Ile
 130 135 140
 Gly Leu Pro Thr Ile Pro Val Met Leu Ile Leu Gly Lys Met Ile Arg
 145 150 155 160
 Trp Glu Asp Tyr Val Leu Arg Leu Trp Arg Lys Tyr Ser Asn Lys Leu
 165 170 175
 Gln Ile Leu Asn Ser Ile Phe Pro Gly Ile Gly Cys Pro Val Pro Arg
 180 185 190
 Ile Pro Ala Glu Ala Asn Pro Leu Ala Asp His Val Ser Ala Thr Arg
 195 200 205
 Ile Leu Cys Gly Ala Leu Val Phe Pro Thr Ile Ala Thr Ile Val Gly
 210 215 220
 Lys Leu Met Phe Ser Ser Val Asn Ser Asn Leu Gln Arg Thr Ile Leu
 225 230 235 240
 Gly Gly Ile Ala Phe Val Ala Ile Lys Gly Ala Phe Lys Val Tyr Phe
 245 250 255
 Lys Gln Gln Gln Tyr Leu Arg Gln Ala His Arg Lys Ile Leu Asn Tyr
 260 265 270
 Pro Glu Gln Glu Glu Ala

275

<210> 59
 <211> 971
 <212> PRT
 <213> Homo sapiens

<400> 59

Val Ser Leu Ala Phe Cys Gln Pro Leu Ser Leu Ser Leu Ser Pro Leu
 1 5 10 15

Leu Pro Leu Ala Ser Ser Leu Ala Pro Glu Arg Thr His Leu Pro Gly
 20 25 30

Pro Gly Ser Leu Leu Leu Ser Pro Pro Ser Phe Pro Ala Arg Pro Arg
 35 40 45

Glu Pro Arg Gly Cys Val Thr Ala Ala Pro Pro Asp Lys Met Asp Thr
 50 55 60

Ala Glu Glu Asp Ile Cys Arg Val Cys Arg Ser Glu Gly Thr Pro Glu
 65 70 75 80

Lys Pro Leu Tyr His Pro Cys Val Cys Thr Gly Ser Ile Lys Phe Ile
 85 90 95

His Gln Glu Cys Leu Val Gln Trp Leu Lys His Ser Arg Lys Glu Tyr
 100 105 110

Cys Glu Leu Cys Lys His Arg Phe Ala Phe Thr Pro Ile Tyr Ser Pro
 115 120 125

Asp Met Pro Ser Arg Leu Pro Ile Gln Asp Ile Phe Ala Gly Leu Val
 130 135 140

Thr Ser Ile Gly Thr Ala Ile Arg Tyr Trp Phe His Tyr Thr Leu Val
 145 150 155 160

Ala Phe Ala Trp Leu Gly Val Val Pro Leu Thr Ala Cys Arg Ile Tyr
 165 170 175

Lys Cys Leu Phe Thr Gly Ser Val Ser Ser Leu Leu Thr Leu Pro Leu
 180 185 190

Asp Met Leu Ser Thr Glu Asn Leu Leu Ala Asp Cys Leu Gln Gly Cys

195

200

205

Phe Val Val Thr Cys Thr Leu Cys Ala Phe Ile Ser Leu Val Trp Leu
 210 215 220

Arg Glu Gln Ile Val His Gly Gly Ala Pro Ile Trp Leu Glu His Ala
 225 230 235 240

Ala Pro Pro Phe Asn Ala Ala Gly His His Gln Asn Glu Ala Pro Ala
 245 250 255

Gly Gly Asn Gly Ala Glu Asn Val Ala Ala Asp Gln Pro Ala Asn Pro
 260 265 270

Pro Ala Glu Asn Ala Val Val Gly Glu Asn Pro Asp Ala Gln Asp Asp
 275 280 285

Gln Ala Glu Glu Glu Glu Glu Asp Asn Glu Glu Glu Asp Asp Ala Gly
 290 295 300

Val Glu Asp Ala Ala Asp Ala Asn Asn Gly Ala Gln Asp Asp Met Asn
 305 310 315 320

Trp Asn Ala Leu Glu Trp Asp Arg Ala Ala Glu Glu Leu Thr Trp Glu
 325 330 335

Arg Met Leu Gly Leu Asp Gly Ser Leu Val Phe Leu Glu His Val Phe
 340 345 350

Trp Val Val Ser Leu Asn Thr Leu Phe Ile Leu Val Phe Ala Phe Cys
 355 360 365

Pro Tyr His Ile Gly His Phe Ser Leu Val Gly Leu Gly Phe Glu Glu
 370 375 380

His Val Gln Ala Ser His Phe Glu Gly Leu Ile Thr Thr Ile Val Gly
 385 390 395 400

Tyr Ile Leu Leu Ala Ile Thr Leu Ile Ile Cys His Gly Leu Ala Thr
 405 410 415

Leu Val Lys Phe His Arg Ser Arg Arg Leu Leu Gly Val Cys Tyr Ile
 420 425 430

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Val Val Lys Val Ser Leu Leu Val Val Val Glu Ile Gly Val Phe Pro
 435 440 445

Leu Ile Cys Gly Trp Trp Leu Asp Ile Cys Ser Leu Glu Met Phe Asp
 450 455 460

Ala Thr Leu Lys Asp Arg Glu Leu Ser Phe Gln Ser Ala Pro Gly Thr
 465 470 475 480

Thr Met Phe Leu His Trp Leu Val Gly Met Val Tyr Val Phe Tyr Phe
 485 490 495

Ala Ser Phe Ile Leu Leu Leu Arg Glu Val Leu Arg Pro Gly Val Leu
 500 505 510

Trp Phe Leu Arg Asn Leu Asn Asp Pro Asp Phe Asn Pro Val Gln Glu
 515 520 525

Met Ile His Leu Pro Ile Tyr Arg His Leu Arg Arg Phe Ile Leu Ser
 530 535 540

Val Ile Val Phe Gly Ser Ile Val Leu Leu Met Leu Trp Leu Pro Ile
 545 550 555 560

Arg Ile Ile Lys Ser Val Leu Pro Asn Phe Leu Pro Tyr Asn Val Met
 565 570 575

Leu Tyr Ser Asp Ala Pro Val Ser Glu Leu Ser Leu Glu Leu Leu Leu
 580 585 590

Leu Gln Val Val Leu Pro Ala Leu Leu Glu Gln Gly His Thr Arg Gln
 595 600 605

Trp Leu Lys Gly Leu Val Arg Ala Trp Thr Val Thr Ala Gly Tyr Leu
 610 615 620

Leu Asp Leu His Ser Tyr Leu Leu Gly Asp Gln Glu Glu Asn Glu Asn
 625 630 635 640

Ser Ala Asn Gln Gln Val Asn Asn Asn Gln His Ala Arg Asn Asn Asn
 645 650 655

Ala Ile Pro Val Val Gly Glu Gly Leu His Ala Ala His Gln Ala Ile
 660 665 670

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Leu Gln Gln Gly Gly Pro Val Gly Phe Gln Pro Tyr Arg Arg Pro Leu
 675 680 685
 Asn Phe Pro Leu Arg Ile Phe Leu Leu Ile Val Phe Met Cys Ile Thr
 690 695 700
 Leu Leu Ile Ala Ser Leu Ile Cys Leu Thr Leu Pro Val Phe Ala Gly
 705 710 715 720
 Arg Trp Leu Met Ser Phe Trp Thr Gly Thr Ala Lys Ile His Glu Leu
 725 730 735
 Tyr Thr Ala Ala Cys Gly Leu Tyr Val Cys Trp Leu Thr Ile Arg Ala
 740 745 750
 Val Thr Val Met Val Ala Trp Met Pro Gln Gly Arg Arg Val Ile Phe
 755 760 765
 Gln Lys Val Lys Glu Trp Ser Leu Met Ile Met Lys Thr Leu Ile Val
 770 775 780
 Ala Val Leu Leu Ala Gly Val Val Pro Leu Leu Leu Gly Leu Leu Phe
 785 790 795 800
 Glu Leu Val Ile Val Ala Pro Leu Arg Val Pro Leu Asp Gln Thr Pro
 805 810 815
 Leu Phe Tyr Pro Trp Gln Asp Trp Ala Leu Gly Val Leu His Ala Lys
 820 825 830
 Ile Ile Ala Ala Ile Thr Leu Met Gly Pro Gln Trp Trp Leu Lys Thr
 835 840 845
 Val Ile Glu Gln Val Tyr Ala Asn Gly Ile Arg Asn Ile Asp Leu His
 850 855 860
 Tyr Ile Val Arg Lys Leu Ala Ala Pro Val Ile Ser Val Leu Leu Leu
 865 870 875 880
 Ser Leu Cys Val Pro Tyr Val Ile Ala Ser Gly Val Val Pro Leu Leu
 885 890 895
 Gly Val Thr Ala Glu Met Gln Asn Leu Val His Arg Arg Ile Tyr Pro
 900 905 910

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Phe Leu Leu Met Val Val Val Leu Met Ala Ile Leu Ser Phe Gln Val
 915 920 925

Arg Gln Phe Lys Arg Leu Tyr Glu His Ile Lys Asn Asp Lys Tyr Leu
 930 935 940

Val Gly Gln Arg Leu Val Asn Tyr Glu Arg Lys Ser Gly Lys Gln Gly
 945 950 955 960

Ser Ser Pro Pro Pro Gln Ser Ser Gln Glu
 965 970

<210> 60
 <211> 225
 <212> PRT
 <213> Homo sapiens

<400> 60

Pro Gly Ser Leu Phe Arg Phe Ala Val Pro Pro Ala Leu Gly Ser Asn
 1 5 10 15

Leu Thr Asp Asn Val Met Ile Thr Val Asp Ile Ile Pro Ser Gly Trp
 20 25 30

Asn Ser Ala Asp Gly Lys Ser Asp Lys Thr Lys Ser Ala Pro Ser Arg
 35 40 45

Asp Pro Glu Arg Leu Gln Lys Ile Lys Glu Ser Leu Leu Leu Glu Asp
 50 55 60

Ser Glu Glu Glu Glu Gly Asp Leu Cys Arg Ile Cys Gln Met Ala Ala
 65 70 75 80

Ala Ser Ser Ser Asn Leu Leu Ile Glu Pro Cys Lys Cys Thr Gly Ser
 85 90 95

Leu Gln Tyr Val His Gln Asp Cys Met Lys Lys Trp Leu Gln Ala Lys
 100 105 110

Ile Asn Ser Gly Ser Ser Leu Glu Ala Val Thr Thr Cys Glu Leu Cys
 115 120 125

Lys Glu Lys Leu Glu Leu Asn Leu Glu Asp Phe Asp Ile His Glu Leu
 130 135 140

49321-89.ST25.txt

His Arg Ala His Ala Asn Glu Gln Ala Glu Tyr Glu Phe Ile Ser Ser
145 150 155 160

Gly Leu Tyr Leu Val Val Leu Leu His Leu Cys Glu Gln Ser Phe Ser
165 170 175

Asp Met Met Gly Asn Thr Asn Glu Pro Ser Thr Arg Val Arg Phe Ile
180 185 190

Asn Leu Ala Arg Thr Leu Gln Ala His Met Glu Asp Leu Glu Thr Ser
195 200 205

Glu Asp Asp Ser Glu Glu Asp Gly Asp His Asn Arg Thr Phe Asp Ile
210 215 220

Ala
225

<210> 61
<211> 291
<212> PRT
<213> Homo sapiens

<400> 61

Met Ser Met Pro Leu His Gln Ile Ser Ala Ile Pro Ser Gln Asp Ala
1 5 10 15

Ile Ser Ala Arg Val Tyr Arg Ser Lys Thr Lys Glu Lys Glu Arg Glu
20 25 30

Glu Gln Asn Glu Lys Thr Leu Gly His Phe Met Ser His Ser Ser Asn
35 40 45

Ile Ser Lys Ala Gly Ser Pro Pro Ser Ala Ser Ala Pro Ala Pro Val
50 55 60

Ser Ser Phe Ser Arg Thr Ser Ile Thr Pro Ser Ser Gln Asp Ile Cys
65 70 75 80

Arg Ile Cys His Cys Glu Gly Asp Asp Glu Ser Pro Leu Ile Thr Pro
85 90 95

Cys His Cys Thr Gly Ser Leu His Phe Val His Gln Ala Cys Leu Gln
100 105 110

Gln Trp Ile Lys Ser Ser Asp Thr Arg Cys Cys Glu Leu Cys Lys Tyr
 115 120 125

Glu Phe Ile Met Glu Thr Lys Leu Lys Pro Leu Arg Lys Trp Glu Lys
 130 135 140

Leu Gln Met Thr Ser Ser Glu Arg Arg Lys Ile Met Cys Ser Val Thr
 145 150 155 160

Phe His Val Ile Ala Ile Thr Cys Val Val Trp Ser Leu Tyr Val Leu
 165 170 175

Ile Asp Arg Thr Ala Glu Glu Ile Lys Gln Gly Gln Ala Thr Gly Ile
 180 185 190

Leu Glu Trp Pro Phe Trp Thr Lys Leu Val Val Val Ala Ile Gly Phe
 195 200 205

Thr Gly Gly Leu Leu Phe Met Tyr Val Gln Cys Lys Val Tyr Val Gln
 210 215 220

Leu Trp Lys Arg Leu Lys Ala Tyr Asn Arg Val Ile Tyr Val Gln Asn
 225 230 235 240

Cys Pro Glu Thr Ser Lys Lys Asn Ile Phe Glu Lys Ser Pro Leu Thr
 245 250 255

Glu Pro Asn Phe Glu Asn Lys His Gly His Gly Ile Cys His Ser Asp
 260 265 270

Thr Asn Ser Ser Cys Cys Thr Glu Pro Glu Asp Thr Gly Ala Glu Ile
 275 280 285

Ile His Val
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<210> 62
 <211> 32
 <212> DNA
 <213> artificial sequence

<220>
 <223> MARCH-II PHD domain reverse primer

<400> 62

49321-89.ST25.txt

atcggcgggcc gctcatgtcc gcttctccgt cc 32

<210> 63
 <211> 34
 <212> DNA
 <213> artificial sequence

<220>
 <223> hUbc6 forward primer

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 atatgctagc gccatgagga gcaccagcag taag 34

<210> 64
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 <212> DNA
 <213> artificial sequence

<220>
 <223> hUbc6 reverse primer

<400> 64
 atatgcatcc tcactcctgc gcgatgctcc tc 32

<210> 65
 <211> 33
 <212> DNA
 <213> artificial sequence

<220>
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 atatgctagc gccatggcgg ggaccgcgct caa 33

<210> 66
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 <212> DNA
 <213> artificial sequence

<220>
 <223> hUbc7 reverse primer

<400> 66
 atagggatcc tcacagtccc agagacttct gg 32